

Appl. No. 10/781,298  
Amdt. Dated August 9, 2006  
Reply to Office Action of May 9, 2006

Attorney Docket No. 81863.0027  
Customer No.: 26021

REMARKS/ARGUMENTS:

Claims 1-9 are pending in the application. Reexamination and reconsideration of the application, in view of the following remarks, are respectfully requested.

The present invention relates to a composite structure that the circumference of a core material made of a sintered diamond is coated with a shell layer made of a sintered alloy. (Applicant's specification, at p. 1, lines 8-9).

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 1-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yong (U.S. Patent No. 6,361,873) in view of Sue (U.S. Patent No. 6,063,502). The Applicant respectfully traverses this rejection. Claim 1 is as follows:

A composite structure comprising:

an elongate core material of a sintered diamond comprising 80% by volume or more diamond particles of a mean particle size not larger than 3.5  $\mu\text{m}$ , and an iron group metal binding the diamond particles; and

a shell layer that covers the circumference of said core material and comprises a sintered alloy of at least one kind of hard particles selected from among carbide, nitride and carbonitride of at least one metal element selected from the group of 4a, 5a and 6a group metals of the Periodic Table and diamond particles of a mean particle size not larger than 5  $\mu\text{m}$ , and an iron group metal binding the hard particles and diamond particles,

wherein content of said diamond particles included in said shell layer is from 5 to 45% by volume.

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Applicant respectfully submits that the cited references cannot render amended claim 1 obvious, because the cited references fail to teach or suggest a composite structure comprising a core material with diamond particles of a mean particle size not larger than 3.5  $\mu\text{m}$  and a shell layer with diamond particles of a mean particle size not larger than 5.0  $\mu\text{m}$ .

It is an aspect of the present invention that as a result of controlling the composition and constitution of the core member 4 and the shell layer 8 in the above-mentioned content ratio, ratio (w/D<sub>1</sub>) of width "w" of the iron group metal-deficient region (a region where concentration of iron group metal is low) in the interface between the core material 4 and the shell layer 8 to the mean diameter "D<sub>1</sub>" of the core material 4 becomes 0.2 or less and preferably 0.1 or less. Thus, the strength of the structure is increased, and the wear resistance and adhesion resistance of the tool are improved while suppressing excessive variation in the chipping resistance. (Applicant's specification, at p. 7, lines 11-17). In contrast, a sample in which the mean particle size of the diamond particles included in the shell layer is larger than 5.0  $\mu\text{m}$ , shows large variations in wear resistance and chipping resistance. (Applicant's specification, at p. 19, lines 5-12; Sample I-5 of Table 2 at p. 18).

Yong teaches a core material and shell containing Poly Crystalline Diamond (PCD). Yong, as acknowledged by the Office, is silent as to the diamond particle size and the dimensions of the core material.

The Office cites Sue for providing the diamond particle size stating,

"Sue teaches a composite construction formed from fibrous rods formed from a core material and an outer shell also used in cutting tools (abstract). The average (mean) particle size of the diamond

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powder is about 4 to 100 microns (example 2), which the examiner is interpreting to make obvious less than 3.5 and 5 microns."

The Applicant respectfully disagrees. Sue in Example 2 teaches a fiber composite construction that included a core formed from PCD. (Sue, column 8, lines 40-52). Sue fails to teach or suggest including diamond powder in the outer shell. Thus, Sue fails to teach or suggest diamond powder of any particle size in the outer shell, much less diamond particles not larger than 5  $\mu\text{m}$  as taught by the present invention.

Furthermore, the diamond particle size range in the core that is taught by Sue is from about 4 to 100 microns, which is predominantly, if not completely, outside of the range of particle sizes of not larger than 3.5  $\mu\text{m}$  taught by the present invention. According to the MPEP 2144.05(III), "Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range." In addition to the benefits obtained with the present invention discussed above, the Applicant's specification, at p. 6, lines 16-18, states, "when the mean particle size of the diamond particles 2 included in the core material 4 is larger than 3.5  $\mu\text{m}$ , the strength of the structure 1 may decrease." Thus, the criticality of the claimed range has been demonstrated.

In light of the foregoing, Applicant respectfully submits that the cited references could not have rendered obvious claim 1, because the cited references fail to teach or suggest each and every claim limitation. Claims 2-9 depend from claim 1 and cannot be rendered obvious for at least the same reasons as claim 1. Withdrawal of these rejections is thus respectfully requested.

Claims 6-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yong in view of Sue and further in view of Rigali (U.S. Patent No. 6,709,737). The Applicant respectfully traverses this rejection.

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Claims 6-8 depend from claim 1 and therefore, cannot be rendered obvious over Yong and Sue for the reasons discussed above. Rigali cannot remedy the defect of Yong and Sue and is not relied upon by the Office for such. Instead, the Office cites Rigali for teaching a composite material comprising filaments that are stacked. These filaments can be manipulated into sheets and can be stacked into layers of sheets wherein the layers have different orientations of the filaments.

In light of the foregoing, Applicant respectfully submits that the cited references could not have rendered obvious claims 6-8, because the cited references fail to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, in view of the foregoing remarks, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

Appl. No. 10/781,298  
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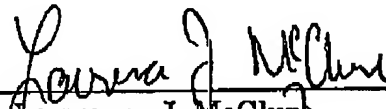
Attorney Docket No. 81863.0027  
Customer No.: 26021

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,  
HOGAN & HARTSON L.L.P.

Date: August 8, 2006

By: \_\_\_\_\_

  
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